Preferably, the plate member comprises a plurality of recesses corresponding to the number of discrete keys. In this case the recesses may be provided with slanting edges that interact with slanting surfaces disposed on the underside of said discrete keys to thereby translate the downwards pushing force on the key into a sideward force.

[0026] It is another object of the present invention to provide an electronic device comprising a processor controlling the operation of the device and a keypad according to claim 1, said processor being coupled to said keypad and said processor being configured to determine which of said discreet or virtual keys has been pressed from a signal from said touch sensors or touch plate, and said processor being configured to determine that a keystroke has been entered when said biased switch is activated.

[0027] The virtual keys can be formed on a touch display and the processor may be configured to display virtual keys on the touch screen.

[0028] The device may further comprise an orientation sensor, in which case the processor can be configured to change the orientation of the virtual keys displayed on the touch screen in response to a signal from said orientation sensor. Thus, the orientation of the key graphics relative to the gravitational field can be maintained when the device changes orientation.

[0029] It is a further object of the invention to provide a method for registering keystrokes on a keypad or keyboard with a plurality of discrete or virtual keys, comprising identifying which of the keys has been struck with touch sensors, and determining that a keystroke has been made with a biased switch.

[0030] With this method, the advantages of touch sensors can be exploited without being exposed to the disadvantages associated with touch sensors.

[0031] The method may further comprise the step of allowing said discrete or virtual keys to travel between an idle position in which the biased switch is not activated and a position in which the biased switch is activated. Thus, the users are provided with the same tactile feedback that is associated with conventional keys.

[0032] The method may further comprise the step of providing a plurality of said discrete or virtual touch keys with tactile feedback by a mechanical link to the biased switch.

[0033] Further objects, features, advantages and properties of the keypads, electronic devices and methods according to the invention will become apparent from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] In the following detailed portion of the present description, the invention will be explained in more detail with reference to the exemplary embodiments shown in the drawings, in which:

[0035] FIG. 1 is a front view of a mobile communication terminal with a keypad according to a first embodiment of the invention,

[0036] FIG. 2 is a partially exploded elevated view on a the mobile communication terminal of FIG. 1,

[0037] FIG. 3 is another partially exploded elevated view on the mobile communication terminal of FIG. 1,

[0038] FIG. 4 is a cross-sectional view through the mobile communication terminal of FIG. 1 when the keypad is not depressed,

[0039] FIG. 5 is a cross-sectional view through the mobile a mobile communication terminal of FIG. 1 when the keypad is depressed,

[0040] FIG. 6 is a front view of a keypad according to a second embodiment of the invention,

[0041] FIG. 7 is an elevated view of a collapsible ring used in the keypad of FIG. 6,

[0042] FIG. 8 is a cross-sectional view through keypad shown in FIG. 6 when the keypad is not depressed,

[0043] FIG. 9 is a cross-sectional view through keypad shown in FIG. 6 when the keypad is centrally depressed,

[0044] FIG. 10 is a cross-sectional view through keypad shown in FIG. 7 when the keypad is depressed off-center,

[0045] FIG. 11 is a top view on a detail of a keypad according to a third embodiment of the invention,

[0046] FIG. 12 is a cross-sectional view of a detail of the keypad of FIG. 11, and

[0047] FIG. 13 is a block diagram illustrating the general architecture of a mobile communication terminal of FIG. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0048] In the following detailed description, the keypad will be described by the preferred embodiments with reference to its use in a mobile communication terminal in the form of a cellular/mobile phone. However, the use in a mobile communication terminal is only exemplary, and the keypad could be used in any other electronic device.

[0049] FIG. 1 illustrates a first embodiment of a keypad according to the invention implemented in a mobile telephone by a front view. The mobile phone 1 comprises a user interface having a housing 2, a display 3, an on/off button (not shown), a speaker 5 (only the opening is shown), and a microphone 6 (not visible in FIG. 1). The phone 1 is adapted for communication via a cellular network, such as the GSM 900/1800 MHz network, but could just as well be adapted for use with a Code Division Multiple Access (CDMA) network, a 3G network, or a TCP/IP-based network to cover a possible VoIP-network (e.g. via WLAN, WIMAX or similar) or a mix of VoIP and Cellular such as UMA (Universal Mobile Access).

[0050] The keypad 7 has a first group of keys as alphanumeric keys, by means of which the user can enter a telephone number, write a text message (SMS), write a name (associated with the phone number), etc. Each of the twelve alphanumeric keys is provided with a figure "0-9" or a sign "#" or "*", respectively. In alpha mode each key is associated with a number of letters and special signs used in the text editing.

[0051] The keypad 2 has additionally a second group of keys comprising two softkeys 9, two call handling keys (offhook key 11 and onhook key 12), and a 5-way navigation key 10 (up, down, left, right and center: select/activate). The function of the softkeys 9 depends on the state of the phone, and navigation in the menu is performed by using the navigation-key 10. The present function of the softkeys 9 is shown in separate fields (soft labels) in a dedicated area 4 of the display 3, just above the softkeys 9. The two call handling keys 11,12 are used for establishing a call or a conference call, terminating a call or rejecting an incoming call. This key layout is characteristic for e.g. the Nokia 6230i™ phone.

[0052] The navigation key 10 is a four- or five-way key which can be used for cursor movement, scrolling and